

# **SUPPRESSION OF DOUBLE RAYLEIGH BACKSCATTERING AND PUMP REUSE IN A RAMAN AMPLIFIER**

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## **Abstract of the Disclosure**

Systems and methods for ameliorating double Rayleigh backscattering induced impairments are provided. Raman amplification is divided among two or more stages.

Optical energy from a single counter-propagating pump may traverse multiple stages while optical energy at the frequency of the signal to be amplified is permitted to

10 propagate in the forward direction only. In this way the pump power can be effectively distributed over the entire amplifier length. The scheme may be implemented in a simple configuration employing a closed circulator and a fiber Bragg grating. Multiple wavelength pump operation may be accommodated as well as either discrete or distributed Raman amplification.

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